EF08 Discussion: Compressed Electroweak SUSY

October 19, 2020

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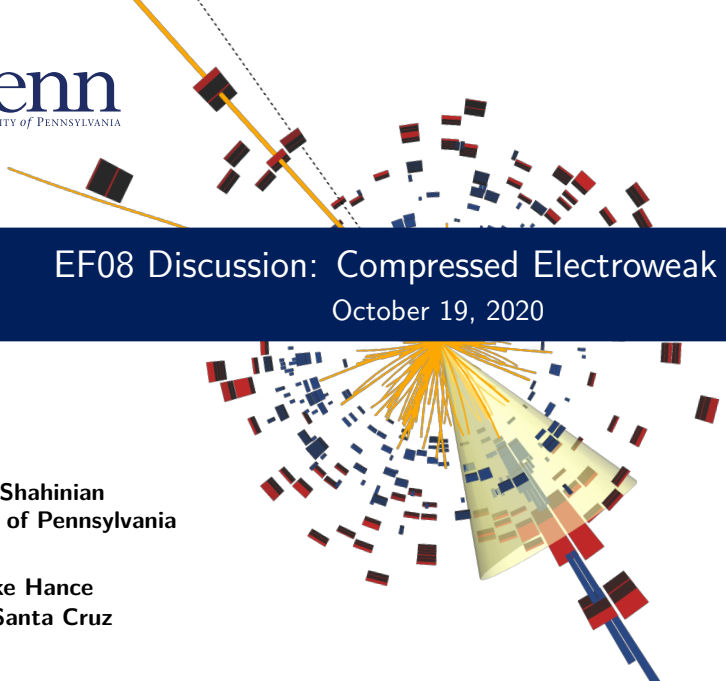
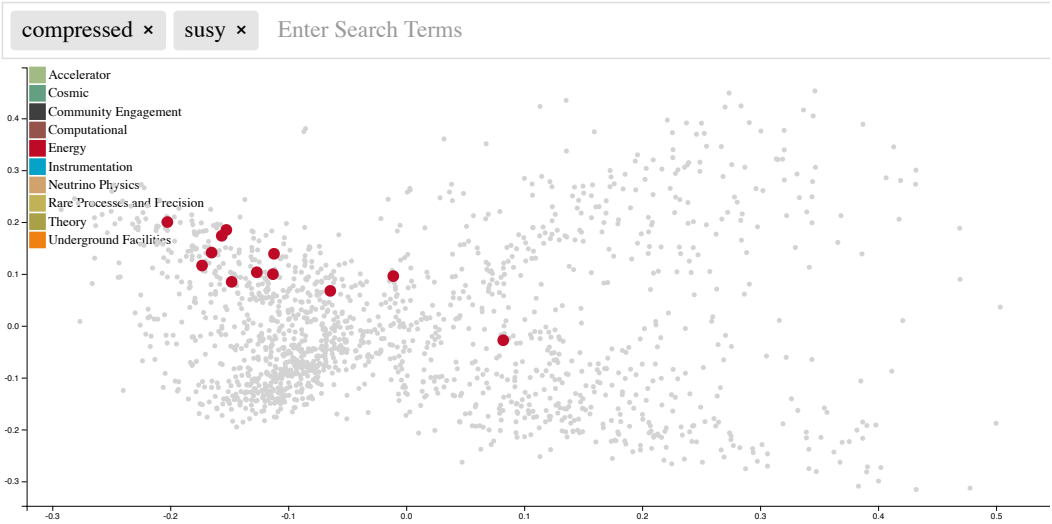


Compressed EWK SUSY LOIs

&& → Searchable LOI Scatter Plot (credit: Gordon Watts)



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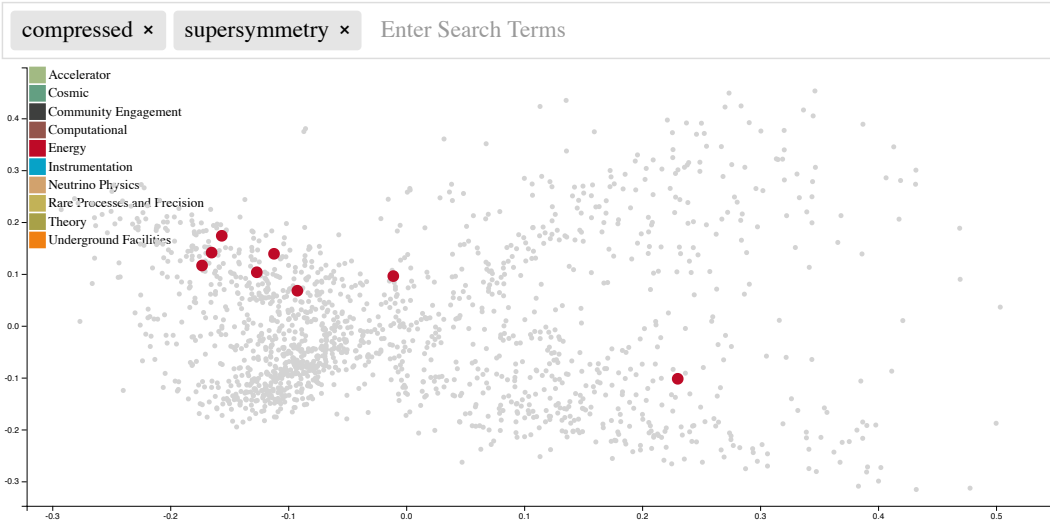

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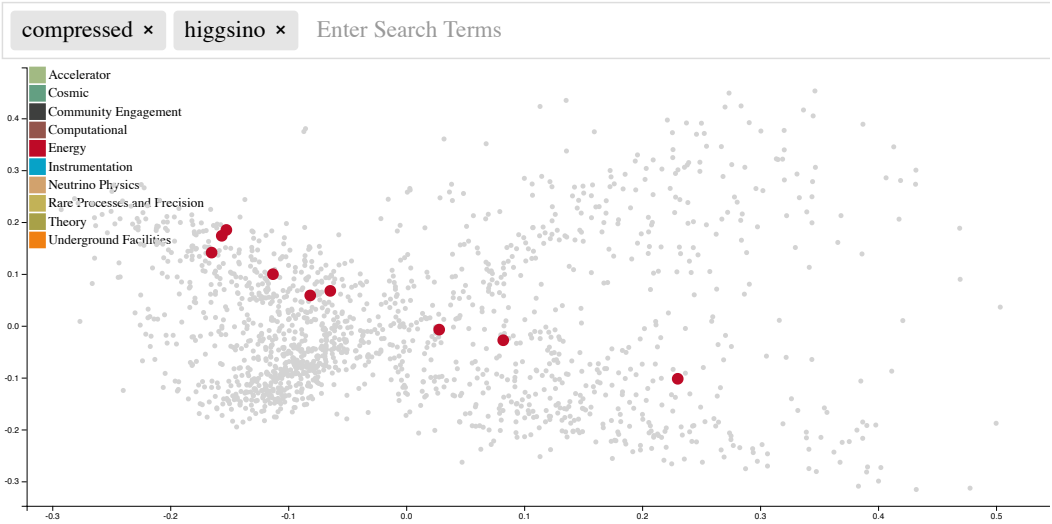


Useful Links/MC Production Summary

- EF MC Task Force report at CPM
  - New full-sim samples will need to be motivated + discussed with conveners/production team
  - Benchmark `Delphes` cards for all machines available here
  - *hh* background samples to be handled centrally (evt. gen. + `Delphes`)
  - *ee*, *eh*, $\mu\mu$ background samples on request , need to provide truth events
  - Signal events generated by users, instructions for coherent generator settings coming soon
- MC/Simulation framework tutorials
- Slack: #ef08-bsm_models-compressed_ewk_susy
- **MC needs spreadsheet**

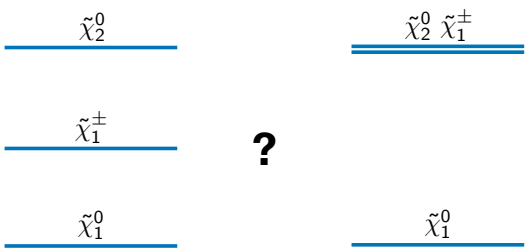
Machine	Energy							
CEPC	m_Z	$2m_W$	240					GeV
FCC-ee	m_Z	$2m_W$	240	$2m_t$				
ILC	250	350		500	1000			
CLIC			380			1500	3000	
HL-LHC/FCC-hh	14	75	100	150				TeV
LHeC/FCC-eh	1.3	3.5						
μμ	3	10	14	30				

		Soft-3L	Soft-2L	VBF-0L	Monojet	*Add more ...*	...
	# charged leptons	3	2	0	0		
	MET	yes	yes	yes	yes		
	# matrix-element jets	>=1	>=1	2	>=1		
	unique features			include pure EWK diagrams			
	Target colliders		13/14/100 TeV pp	13/14/100 TeV pp	100 TeV pp		
Process	W->lν						
	Z->ll						
	Z->νν						
	VV->4L						
	VV->3L						
	VV->2L						
	VV->1L						
	VVV						
	Higgs						
	ttbar						
	single-top						
	QCD multijet						
	V+jets, pure EWK (VBF)						

Some Open Items

Signal

- Standardized ewkino mass spectrum?
- Compressed wino/bino models?
- Benchmark non-simplified models?
- Cascade decays (see Grahams slides)?
- ...



Backgrounds

- Make sure they will be produced!
- Ensure `Delphes` parameterizations extend to sufficiently soft leptons
- Fake lepton estimates: use 13 TeV ATLAS/CMS papers to "calibrate" MC fakes at *hh* colliders?
  - Would require bkg. samples at 13 TeV, with same generator/`Delphes` configs as (e.g.) 100 TeV
- ...

Today's Agenda

Compressed Electroweak SUSY Discussion

Monday Oct 19, 2020, 9:00 AM → 10:10 AM US/Central

Description Zoom link:

https://ucsc.zoom.us/j/91094290764?pwd=Vy84bURtdDhaVHlpVVB2YXJlMFFSQT09

9:00 AM → 9:10 AM **Introduction** 10m

Speakers: Jeff Shahinian (University of Pennsylvania (US)), Mike Hance (UC Santa Cruz)

9:10 AM → 9:40 AM **Compressed spectra from Muon g-2 and Dark Matter** 30m

Speakers: Manimala Chakraborti (IFT, Madrid, SPain), Sven Heinemeyer (IFT (CSIC, Madrid))

9:40 AM → 10:10 AM **Discussion** 30m

Backup